

THE DEPARTMENT OF PHYSIOLOGY, PATHOPHYSIOLOGY AND BIOCHEMISTRY'S PERSONAL EXPERIENCE IN REMOTE LEARNING CONDITIONS

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In the conditions of a remote form of education, the situation is significantly complicated by the lack of personal communication. Higher education students passively act as observers. This significantly reduces their interest in studying disciplines. The task of the teaching staff of our department is to use our pedagogical experience to keep the quality of the educational process. The use of specially developed hardware and software complexes, STEM technologies, work in STREAM mode, the use of various services and platforms for training help to create a limitless space for achieving the goal. Involving students to participate in scientific clubs, seminars, webinars, panel discussions, creating reports and presentations at scientific events, participating in scientific conferences helps higher education students to take an active life position. With the support of teachers and the use of the latest educational technologies, positive results in education should be expected from the students. The teachers of the Department of Physiology, Pathophysiology and Biochemistry of the Faculty of Veterinary Medicine of Odesa State Agrarian University (OSAU) have focused their attention on improving the quality of the educational process, incorporating interactive and multimedia teaching methods into the usual learning process and are ready to share their experience.

Key words: *professionalism, quality of education, humane education, innovative methods, hardware and software complexes, virtual laboratory, digitalization, STREAM mode.*

FORMULATION OF THE PROBLEM

The quality of the educational process is considered to be the basis for the preparation of higher education students. Considering March 12, 2020, as the starting point according to the resolution of the Cabinet of Ministers of Ukraine [4], education in all educational institutions of Ukraine was transferred to a distance format due to the COVID-19 pandemic.

The beginning was difficult for both teachers and higher education students. The level of knowledge of teachers, professional and pedagogical skills should be supported by the material and technical base of the educational institution. In the conditions of a remote form of education, the educational process is significantly complicated by the lack of personal communication. Even in the presence of equipped educational laboratories, special equipment for performing laboratory work and conducting research, the assimilation of information by students is reduced by several times. In this case higher education students, as a rule, act as observers. This significantly reduces their interest in studying disciplines. It is difficult to test theoretical knowledge by practice in the conditions of distant learning. Therefore, in order to solve such problems, teachers should use multimedia, interactive, informational teaching methods in their activities, master the latest technologies.

The professionalism of the department's teachers is constantly growing due to planned and unscuduled professional development, participation in university, all-Ukrainian and international scientific conferences, webinars, workshops, seminars, congresses, etc. This is confirmed by the fact that the main staff of the department consists only of candidates and doctors of science. Teachers are also engaged in self-education, the purpose of which is to improve professional skills. The result of such preparation is the application of modern teaching methods and the use of knowledge to transfer it to higher education students with maximum benefit.

In addition to the listed difficulties for assimilation of educational material by students today, it is possible to note the lack of high-quality gadgets, which refers to subjective reasons that significantly affect the quality of education. Unstable and unreliable Internet connection, lack of electricity in places of residence of higher education students can be considered as objective reasons that hinder the learning process.

ANALYSIS OF CURRENT RESEARCH

The issue of applying the achievements of scientific and technical progress in the conditions of remote form of education is quite acute for the third year in a row. It should be mentioned that in the last three years, due to objective reasons of a global nature, the level of knowledge of students in the final grades of schools has decreased. Thus, the teaching staff of a higher educational institution faces an important issue in the development of methods of teaching disciplines to obtain quality knowledge of higher education students. According to approximate calculations, almost seven million higher education students are covered by distance education today.

Problems of the development of distance learning were studied by native and foreign scientists at the beginning of the century [9, 10]. Two components - professional and fundamental - are the basis of specialist training, and should integrate targeted, individual and differentiated training [7].

Today, you can learn the works of native and foreign scientists who have made an deep analysis of modern distance learning, an overview of its positive and negative sides. As a result of the research, there were useful tips on overcoming obstacles and turning disadvantages into advantages. Scientific works of V. Oliynyk, V. Kuharenko, O. Bisikalo and others. were laid as a basis for the study of the features of distance learning in Ukraine. In turn, foreign scientists, such as K. Hunter, E. Downes, J. Anderson, etc., shared their experience and provided a lot of useful information about the prospects for the development of distance learning [8].

The following foreign educational institutions can be cited as examples of advanced distance learning: China Teleuniversity (China), National Open University named after Indira Gandhi (India), Paynam Noor University (Iran), Korea National Open University (Korea), University of South Africa, Sukhothai Thampariat Open University (Thailand), Anadolu University (Turkey) [6].

THE AIM OF THE WORK

The aim of this scientific work is to analyze the specifics of the study of the disciplines taught at the Department of Physiology, Pathophysiology and Biochemistry for the use of the acquired knowledge by students in their future profession, both as a doctor of veterinary medicine and in the field of original scientific research. It is necessary to pay attention to the change of methodical approaches to the teaching of disciplines, to develop recommendations for improving the quality of education, facilitating the assimilation of educational material by students and increasing their success rate.

RESEARCH RESULTS

In accordance with the standards of education, basic school preparation plays an important role as a foundation of knowledge for the further development of a student in a higher educational institution. The learning process as a whole can be considered as a student-teacher symbiosis in accordance with the topics of the work program. The subjects taught in the first year are based on the knowledge of mathematics, physics, chemistry and biology and are the basis of the study of special subjects. The department studies such disciplines as “Biophysics”, “Animal physiology”, “Physiology of farm animals”, “Pathological physiology of animals”, “Animal biochemistry”, “Animal biochemistry with the basics of physical and colloid chemistry”, “Veterinary immunology”, “Clinical Animal Physiology”, “Animal Neurophysiology”, etc.

According to the law “On Education” [5], the teacher has the academic freedom to choose methods and technologies for teaching the material.

The lecture course is designed to be mastered by students with the help of a teacher and independently. Theoretical information can be obtained by listening to lectures and reading materials on the Moodle platform. Video materials of lectures that can be suggested by the teacher, found on Internet resources independently, recorded by the lecturer and uploaded to YouTube channels will be useful. This lecture material is intended not only for the use of higher education students of our university, but also for the dissemination of information to a wider audience.

Figures 1, 2 show examples of posting recordings of lectures by teachers of our department on the YouTube channel [2, 3, 1].

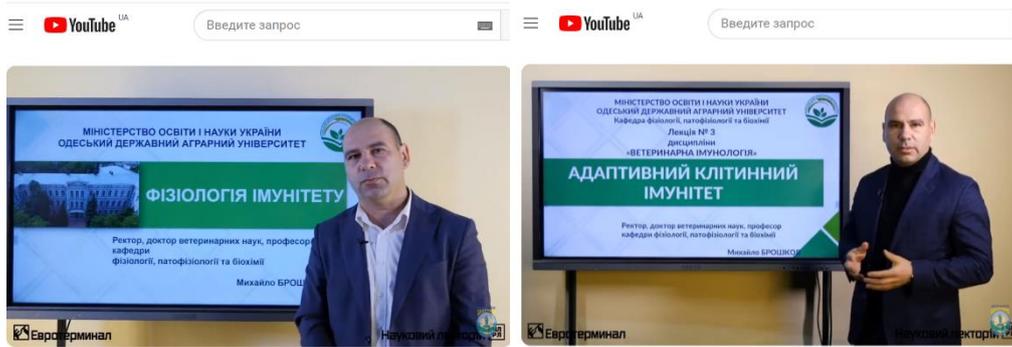
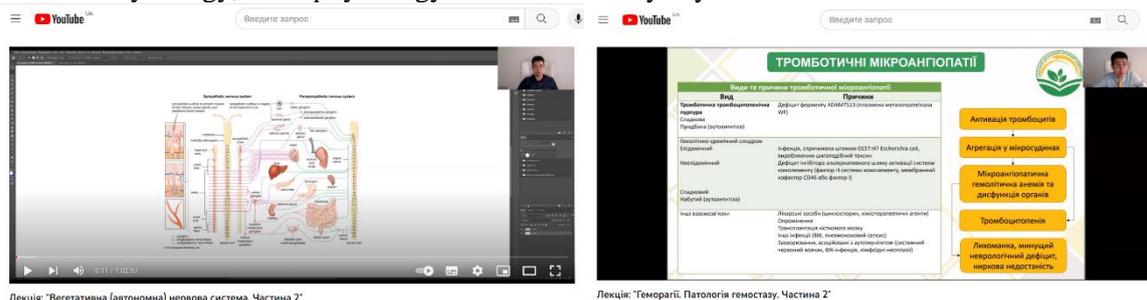


Fig. 1. An example of posting recordings of the lectures of the rector of OSAU, professor of the Department of Physiology, Pathophysiology and Biochemistry Mykhailo Broshkov on the YouTube channel



Лекція: "Вегетативна (автономна) нервова система. Частина 2"

Лекція: "Тромбозі: Патологія гемостазу. Частина 2"

Fig. 2. An example of posting recordings of the lectures of the head of the Department of Physiology, Pathophysiology and Biochemistry, Associate Professor Yuri Boyko on the YouTube channel

Working with the basic and additional literature allows higher education students to broaden their minds. When conducting laboratory classes, it is important to study the theoretical part thoroughly, conduct the experimental part, and make conclusions. When implementing distance learning, the stumbling block is the practical side of performing work, for which in the conditions of distance learning, video materials are used both from the personal experience of the teacher, and video materials distributed from the Internet. For example, working in a virtual laboratory brings students closer to reality, increases the level of knowledge, develops the ability to independently make decisions and make conclusions. A feature of the VR laboratory is the presence of immediate feedback. Figure 3 shows the process of performing the experiment within the discipline of the department.

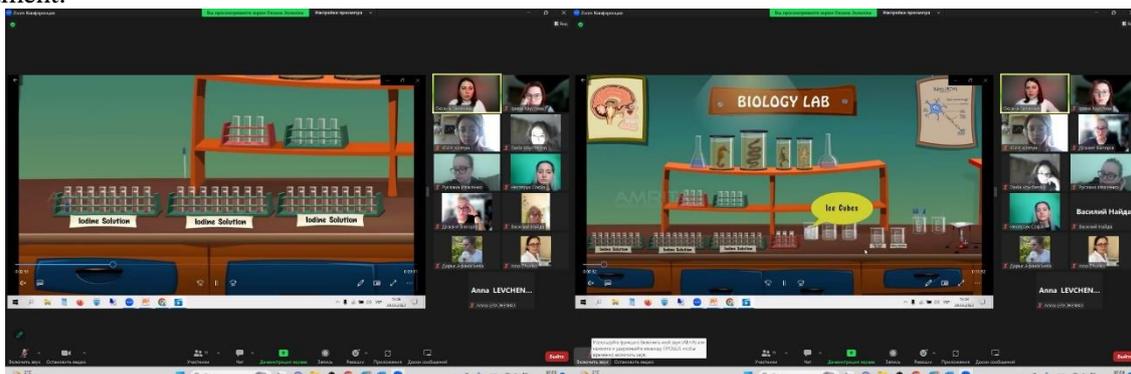


Fig. 3. Conducting a laboratory class in the discipline "Biochemistry of animals" using a virtual laboratory STEM technologies, the use of educational platforms and services for distance learning can be considered useful for testing students' knowledge and interest: Moodle, Google Classroom [11], YouTube, Zoom, Kahoot, etc. It is offered to include in the educational process dialogues (question-answer), role-playing and simulation-modeling games, which introduce an element of competition. It has been confirmed that the creation of small groups (teams of 3...4 students) within each group provides an opportunity to work collectively, conduct an active discussion, analyze the question itself and answer options, forces you to use personal knowledge, refer to reference literature. No student is left without attention, depending on the activity, he will receive additional points for work in laboratory classes.

The importance of paying attention to visual images, primitive drawings (construction of simple diagrams, graphs, consideration of the principles of operation of laboratory equipment), showing slides was noted. When performing laboratory work, it is recommended to repeatedly refer to the previous material as a base during

the lesson. It is important not only to demonstrate equipment and devices, but to involve students in performing laboratory work with an additional and repeated explanation of each step and physical process, to inculcate the ability to apply formulas selected for a given physical process or phenomenon, to perform calculations, to process measurement results. Compiling a report on laboratory work is mandatory, which helps the student to evaluate their knowledge on a given topic, to confidently navigate the creation of a biology-physics tandem, to track the relationship between disciplines.

In laboratory classes in “Biophysics” and other disciplines of the department, the capabilities of the Zoom platform are used for surveying. Mini-groups of three to four students receive tasks and are separated from each other in separate “rooms” - Room 1, Room 2, etc. Students are given time for discussion, for example, 10 minutes, and they communicate in their “room” and do not disturb other students. When the time is up, all students return to the general group and answer the questions. This survey method provides an opportunity to learn to work in a team and introduces an element of competition between groups.

After receiving basic theoretical training in the discipline at lectures, students face a difficult task of confirming and analyzing the acquired knowledge in practice. The STREAM mode is being actively implemented in the faculty's educational space. At the Department of Physiology, Pathophysiology and Biochemistry, laboratory classes in STREAM mode in the disciplines “Animal Biochemistry”, “Veterinary Immunology”, “Biotechnology”, etc. take place on the basis of the multidisciplinary laboratory of veterinary medicine of OSAU. In real time, under the guidance of the department’s teachers and laboratory staff, students of higher education institutions have the opportunity not only to familiarize themselves with the work of the laboratory, but also to learn the methodology of conducting biochemical, hematological and other studies and to analyze the results. Each student has the opportunity to remotely manage work in the laboratory: from obtaining biological material to drawing up a research protocol. This contributes to better assimilation of the material. Figure 4 shows a laboratory session in STREAM mode in the discipline “Animal Biochemistry”.

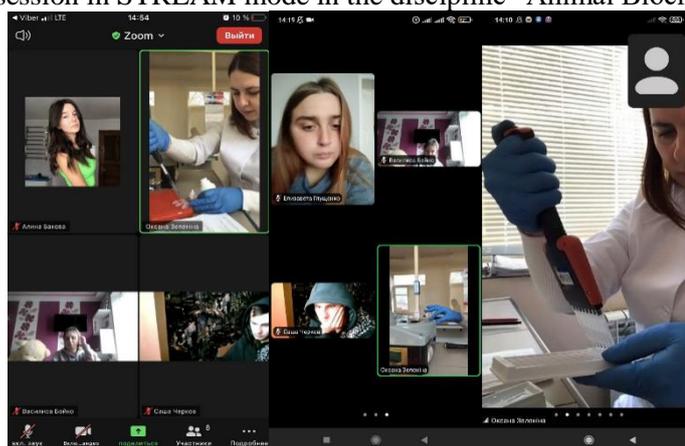


Fig. 4. Laboratory session in STREAM mode on the discipline “Biochemistry of animals”.

Within the framework of the program of humane treatment of animals, the teachers of the department use the possibilities of innovative methods of humane education, specially developed hardware and software complexes. This allows to exclude live animals from dangerous traumatic experiments. The use of the specified methods allows to ensure the interactivity of the educational process, enables the student to conduct experimental research and practice practical skills on his own (Fig. 5).



Fig. 5. Demonstration of an experiment with muscle tissue in a lesson on the topic “Bioelectric phenomena in living tissues”

The result of the fruitful work of the department’s employees in the direction of humane education is the participation of the head of the department in the seminar on the topic: “Application of innovative teaching methods in humane education”, which took place on August 18, 2023.

It is known that distance learning (Distance Learning, Distance Education) is a form of organization of the educational process, which is based on the independent work of the student. In the conditions of distance learning, the lion's share of acquiring knowledge and skills falls on the shoulders of students as independent work, therefore it should be comprehensively supported and developed.

You should pay attention to writing essays and creating presentations on given topics. Writing an essay is an important element of studying a discipline, it is the first step towards the development of a student as a future scientist, because it forms student's logical thinking, skills in working with literary sources and Internet resources. The student learns to analyze the physical and physico-chemical mechanisms of interactions that are the basis of biological processes occurring at different levels of organization of living matter: molecular, cellular, population. You should pay attention to the creative side of this type of independent preparation, because the essay should contain full, detailed answers. These answers are supported by examples from lectures, personal experience, knowledge and observations.

Students receive incentive points at seminars when they present their essays and presentations. Seminars and panel discussions are held at a convenient time, at consultations provided by the schedule. Each report is discussed, students get answers to questions about the topic, deepen their knowledge. In this way, additional information is learnt by higher education students, thereby reducing the time for other students to study the issues considered in the essay.

On April 4, 2023, the teachers of the department organized a webinar "Anti-inflammatory herbal preparations". The webinar was opened by the presentation of the assistant professor of the department, Olena Martynova. The event was attended by teachers from other departments of the faculty, guests from abroad, and students (Fig. 6). A lively discussion took place, even students demonstrated their knowledge of homeopathy in general, teachers shared their experience of using herbal preparations in their practice.

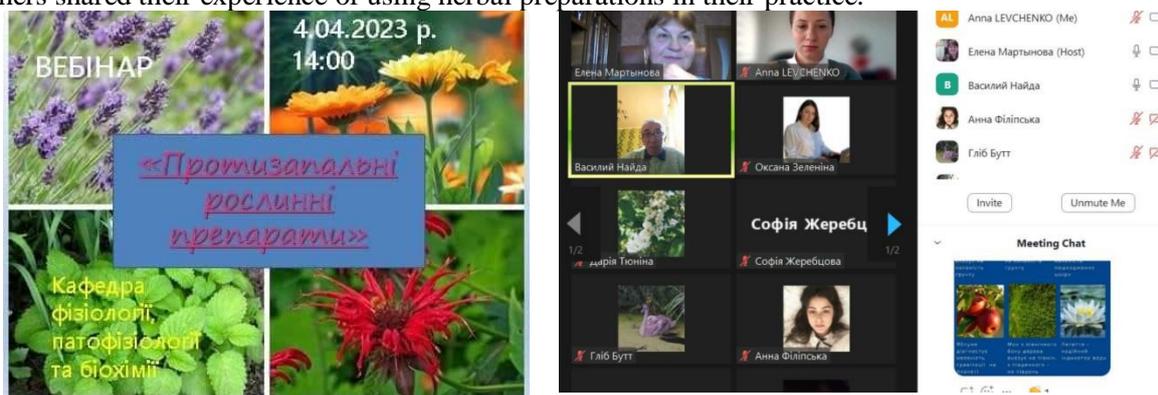


Fig. 6. Discussion by webinar participants of questions on the topic of the webinar "Anti-inflammatory herbal preparations"

The teachers of the department manage the scientific work of students, the results are reports of students both at scientific student conferences at the university and at international conferences.

The scientific student group "Animal Biochemistry" is organized at the department. There are 18 students in the group. Based on the results of the "Biochemistry of Animals" group, on June 1, 2023, an interfaculty student seminar "Not Like Everyone" was held with the participation of students from schools and lyceums of Odesa, which gathered more than a hundred participants. The reports of the speakers of the seminar were presented. The academic leaders of the department were: associate professors Yu. Boyko, V. Naida, O. Martynova, assistants O. Zelenina, T. Fedkalova. At the end of the event, the organizers offered a speed quiz-game and the correct answer on the "Kahoot" platform (Fig. 7). This brought an element of excitement to the program of the event, which is an important element of students' interest.



Fig. 7. Screenshot from the teacher's screen - quiz results, held on the "Kahoot" platform.

As a result of the application of the latest teaching methods, it is possible to note better attendance at classes, general interest in the educational process, an increase in the level of students' knowledge, which is reflected in an increase in the average score both in the current knowledge test and in the final assessment.

On the basis of OSAU, for the second year in a row, advanced training courses "Quality assurance of higher education: innovative methods and teaching technologies" are being held, in which the teachers of our department: Yuriy Boyko and Olena Martynova share their experience.

DEPARTMENT DEVELOPMENT PROSPECT

The strategic direction in the development of the department is digitalization of the educational process in terms of conducting laboratory classes. Taking into account the national and European regulatory and legal requirements regarding the humane treatment of animals, work has begun on the basis of the department to create a course of laboratory classes on animal physiology in the format of virtual reality. Currently, the work on creating the first laboratory class "Physiology of digestion in the mouth cavity" is being completed (Fig. 8). After approbation of the methodology of conducting a laboratory session in the format of virtual reality with students, work will be carried out to find funds to finance the implementation of the entire course.



Fig. 8. Approbation of a laboratory class in the discipline "Physiology of animals" on the topic "Physiology of digestion in the mouth cavity" in the mode of virtual reality

CONCLUSIONS AND OFFERS

The teachers of the Department of Physiology, Pathophysiology and Biochemistry have accumulated considerable experience in the implementation of distance education in the educational process. We recommend the pedagogical and educational experience of teachers as promising for further application by teachers of other departments in the conditions of distance learning. We offer the use of modern technologies, the use of specially developed hardware and software complexes, STEM technologies, work in STREAM mode for active communication between the teacher and students. How students can be more involved in participation in scientific circles, independent preparation, creation of reports and presentations at scientific events, participation in scientific conferences and Olympiads. Carrying out various educational activities adds elements of interest to the learning process, which encourages students to immerse themselves in the world of new and useful things.

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ДОСВІД РОБОТИ КАФЕДРИ ФІЗІОЛОГІЇ, ПАТОФІЗІОЛОГІЇ ТА БІОХІМІЇ В УМОВАХ ВІДДАЛЕНОЇ ФОРМИ НАВЧАННЯ

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В умовах віддаленої форми навчання ситуація значно ускладнюється відсутністю особистого спілкування. Здобувачі вищої освіти (ЗВО) пасивно виступають в ролі спостерігачів. Це значно знижує їх інтерес до вивчення дисциплін. Задача викладацького складу нашої кафедри полягає у використанні свого педагогічного досвіду для збереження якості освітнього процесу. Застосування спеціально розроблених апаратно-програмних комплексів, STEM-технологій, робота в режимі STREAM, використання різноманітних сервісів та платформ для навчання допомагають створити безмежний простір для досягнення мети. Залучення студентів до участі в наукових гуртках, семінарах, вебінарах, круглих столах, створення доповідей і презентацій на наукові заходи, участь у наукових конференціях допомагає зайняти ЗВО активну життєву позицію. За підтримки викладачів і з застосуванням новітніх освітніх технологій слід очікувати позитивні результати в навчанні зі сторони студентів. Викладачі кафедри фізіології, патофізіології та біохімії факультету ветеринарної медицини Одеського державного аграрного університету (ОДАУ) сконцентрували свою увагу на поліпшенні якості освітнього процесу, втіленні в звичний процес навчання інтерактивного і мультимедійного методів навчання і готові поділитися своїм досвідом.

Ключові слова: *професіоналізм, якість навчання, гуманна освіта, інноваційні методи, апаратно-програмні комплекси, віртуальна лабораторія, цифровізація, режим STREAM.*